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From Sentiment to Strategy: Measuring the Impact of Customer Feedback on Firm Performance

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Abstract: *In the digital era, customer feedback, particularly online reviews and social media engagement, has become increasingly important for firms. This study examines the influence of online reviews and social media engagement on a firm's performance. Online reviews from some applications on the App Store were extracted using the analytical website appfollow.io. Data on social media engagement are gathered from firms' official Instagram accounts. This study focuses on the Kompas100 Index from 2018 to 2022. The findings of the study reveal that online reviews negatively impact firm performance, while social media engagement has a positive effect on firm performance. This research may contribute to the body of knowledge on the importance of customer feedback in the digital era. The findings offer valuable insights for firms, providing guidance on how to leverage online positive reviews and social media engagement to enhance firm performance and gain a competitive advantage.*
Keywords: *Customer Feedback, Online Reviews, Social Media Engagement, Firm Performance, Digitalization.*

INTRODUCTION

The digital era has revolutionized the way businesses interact with their customers, particularly through online reviews and social media engagement (Belitski et al., 2022). Online reviews play a crucial role in shaping customer perceptions and purchase decisions. Research suggests that businesses are leveraging online platforms not only for customer interaction but also to enhance their overall online customer experience (Deshwal & Goyal, 2024). In this context, Customer interactions through smartphone apps are crucial in influencing attitudes and actions (Kumaraperumal et al., 2024), as these platforms facilitate direct communication and engagement, further influencing purchasing decisions. Customer reviews impact prospective consumers' decision-making by providing insightful information about the advantages and disadvantages of goods and services. These reviews also help build trust and credibility for the brand. Social media platforms offer a new avenue for brands to build relationships with their customers (Anum et al., 2023). Through effective social media marketing activities, firms can foster value co-creation behaviors by enhancing customer engagement and building trust-based relationships (Huyen et al., 2024). Engaging with customers through social media enables firms to build brand trust and strengthen consumer brand engagement by sharing relevant content, responding to queries, and gathering feedback in real time (Saikia & Bhattacharjee, 2024). Moreover, social media marketing influences various factors that enhance users' brand awareness, helping firms improve customer satisfaction, increase brand exposure, and expand their audience reach (Nguyen et al., 2024).

Social Influence Theory serves as the framework for understanding how customers' engagement with online platforms and their interactions with firms through social media may reflect their perceptions of products and services (Willis, 2019). Previous research has highlighted the importance of consumer sentiment on social media in shaping purchasing decisions, with influencer marketing playing a key role in enhancing brand engagement and consumer interaction (Le, 2024). However, since the majority of research focuses on customer involvement or mood as intermediaries, there has been little emphasis on analyzing the impact of online reviews on firm performance (Meire et al., 2019).

This study aims to investigate the impact of online reviews and social media engagement on firm performance, focusing on firms from the KOMPAS100 Index that are listed on the Indonesia Stock Exchange (BEI) for the period 2018-2022. The KOMPAS100 Index consists of the 100 largest and most liquid public firms on the Indonesia Stock Exchange (IDX), representing around 70-80% of the total market capitalization. This makes the KOMPAS100 Index a representative sample of the Indonesian stock market. It covers various industry sectors, allowing for analysis of the impact of the research variables on firm performance across different sectors (Ichwanudin & Kambara, 2023). The selection of the 2018-2022 period is highly relevant to the growth of the digital era, social media influence, and online reviews. According to Maulana (2020), the 2018-2022 period marks a rapid increase in social media usage and online reviews in Indonesia. This study uses the annual ratio of positive reviews for firms' applications as

a key metric for assessing firm performance. Meanwhile, social media engagement is assessed by comparing the total amount of posts and followers on each of the firms' social media accounts, with an emphasis on Instagram as the selected measuring platform. The study intends to offer important insights into how social media participation and online reviews affect firm performance by examining these variables.

In a separate study done by Sadalia et al. (2021), it was found that Instagram engagement and financial performance are positively correlated. However, a study conducted by Haris et al. (2023) found no connection between Instagram engagement and firm performance. This discrepancy may be the result of the research's wide-ranging industry sample. Social media platforms may not be adopted by some businesses because of their inherent characteristics. This study intends to add to the body of literature by examining how social media participation and online reviews affect firm performance. It also seeks to provide valuable insights into the dynamics of customer feedback in the digital age.

1. METHOD

1.1Sample and Data

This study uses secondary data from 100 firms listed on the Indonesia Stock Exchange (BEI) and the KOMPAS100 Index from the period 2018-2022. The KOMPAS100 index, a collaborative effort between Kompas Gramedia Group, a media firm in Indonesia, and the Indonesia Stock Exchange (BEI), serves as a metric to evaluate the stock price performance of 100 firms with substantial market capitalization, strong liquidity, and favorable financial fundamentals (IDX, 2021). Out of the initial 100 firms included in the study, those with missing data related to not having an application on the App Store and social media engagement on Socialblade were excluded. As a result, the final dataset consisted of 15 firms. These firms were selected due to their strong digital presence, consistent public reporting, and prominent industry positions. These characteristics ensure the availability of reliable data and make them particularly suitable for analyzing the impact of online reviews and social media engagement on firm performance. This sample is considered representative of firms actively engaged in digital transformation and provides a meaningful basis for generating insights relevant to broader business and industry contexts in Indonesia. The research incorporates information from the years 2018 to 2022, making the total dataset size 60. This period was chosen to capture a critical phase of digital transformation, particularly during the COVID-19 pandemic, which significantly accelerated firms' reliance on digital platforms for customer interaction, communication, and marketing.

Data for online reviews from firms' applications on the App Store were extracted using the analytical website appfollow.io, where each review is rated on a 1–5 scale: 1 means very dissatisfied, 2 dissatisfied, 3 neutral, 4 satisfied, and 5 very satisfied, reflecting customer satisfaction levels through star ratings. Review scores were categorized using a dummy variable, with scores of 1 and 2 classified as negative (0) and scores of 3, 4, and 5 as positive (1). The annual positive review ratio was then measured by dividing the total positive reviews by the total reviews for each year. Online reviews are sourced from the App Store as they are considered more credible than Google Reviews or the Play Store. App Store users are verified, reducing the risk of fake reviews, and its strict curation standards ensure the quality of reviewed apps. (Andrina et al., 2022). Furthermore, according to Puspita (2024)Most iOS users in Indonesia belong to a premium, high-purchasing power segment, aligning with the target market of KOMPAS100 firms. Meanwhile, data on the firm's social media engagement were collected manually from Socialblade. Linear Regression is employed to test the research hypotheses. The STATA application was used for the data analysis procedure, and the panel data method was used to acquire the data. STATA is used because it offers several analytical tools that facilitate reliable panel data processing, improving the validity and precision of the study findings (Hyun et al., 2022). The sampling technique used in this research is purposive sampling. The following criteria were applied for choosing the research sample:

1. firms listed on the KOMPAS100 Index
2. Publish financial statements as of December 31 for each year from 2018 to 2022
3. Have an official Instagram account operating during the years 2018 to 2022.
4. Note: If a firm has more than one official Instagram account, the most dominant Instagram account will be used.
5. Have app reviews on the App Store active during the years 2018 to 2022.
6. Note: If a firm has more than one application on the App Store, the application with the most reviews will be used.
7. Have complete data related to the variables used

2.1Variables

Firm performance serves as the dependent variable and is measured using ROA and ROE. Online Review and Social Media Engagement are the independent variables, with online review being measured as the ratio of positive reviews per year, and social media engagement being measured by dividing the total number of Instagram followers by the total posts within a specific year.

Additionally, the control variables that may affect the performance of the firm are firm growth, firm liquidity, and firm size. Firm growth is measured by the percentage change in net revenue from the prior year to the current year; the current ratio, which is measured by dividing the current assets of the firm by its current liabilities for a specific year, indicates the firm's liquidity; and firm size is measured by total operating revenue.

Table 1 Variable Measurements

Variable	Description
FP	Firm performance is measured by Return on Asset (ROA) and Return on Equity (ROE). By dividing the firm's net profit by its total assets for a specific year, ROA is measured. ROE is measured by dividing the net profit of the firm by the total equity in a specific year.
OR	Online Review is measured as the ratio of positive reviews per year.
SME	Social Media Engagement is measured by the total number of Instagram followers and the total number of posts made over a specific year.
FG	Firm growth is measured by the percentage change in the firm's net revenue from the previous year to the current year.
FL	Firm liquidity is measured by the current ratio, which is calculated by dividing the current assets of the firm by its current liabilities for a specific year.
FS	Firm size is measured by total operating revenue.

*3.3*Model

The model below is utilized to test the hypotheses:

$FP(ROA)_{it} = \beta_0 + \beta_1 OR_{it} + \beta_2 SME_{it} + \beta_3 FG_{it} + \beta_4 FL_{it} + \beta_5 FS_{it} + \varepsilon$

$FP(ROE)_{it} = \beta_0 + \beta_1 OR_{it} + \beta_2 SME_{it} + \beta_3 FG_{it} + \beta_4 FL_{it} + \beta_5 FS_{it} + \varepsilon$

Where FP_{it} is firm performance i in year t; OR_{it} is online review of firm i in year t. SME_{it} is social media engagement of firm i in year t; FG_{it} firm growth, FL_{it} firm liquidity, FS_{it} is firm size. Firm growth, firm liquidity, and firm size serve as control variables for firm i in year; β_0, β_1, β_2, β_3, β_4, and β_5 represent parameters to be estimated, with ε as the error term.

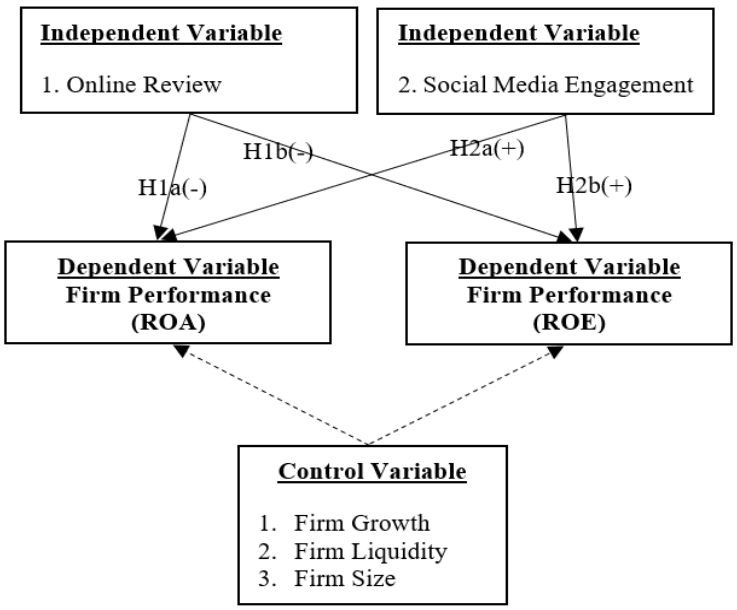

Figure 1 Research Model

2. FINDINGS AND DISCUSSIONS

Table 2 presents the descriptive statistics; ROA values range from -14.79 to 28.47, with an average of 5.42 and a standard deviation of 8.09, indicating significant variation in asset utilization efficiency among firms in the KOMPAS100 index. The lowest ROA value (-14.79) reflects substantial losses for some firms, while the highest (28.47) demonstrates excellent performance. The average ROA of 5.42 suggests that most firms were able to generate reasonable profits from their assets during the 2018-2022 period. ROE values, on the other hand, range from -1.50 to 2.38, with an average of 0.10 and a standard deviation of 0.39, indicating variability in firms' ability to generate returns from shareholders' equity. The negative ROE values point to losses for some firms, while the highest value (2.38) shows that a few firms generated solid returns. The average ROE of 0.10 suggests that overall, firms in the KOMPAS100 had relatively low profitability from equity during the study period.

The online review variable was measured using app reviews from the App Store for firms listed in KOMPAS100 during 2018-2022. Review scores, ranging from 1 to 5, were averaged annually. The descriptive statistics show a minimum score of 0.08 and a maximum of 0.89, with an average of 0.41 and a standard deviation of 0.21, reflecting moderate variability in user satisfaction. These results indicate generally low app review ratings for KOMPAS100 firms, with no firm achieving perfect user satisfaction. The social media engagement (SME) variable was derived from Instagram data, measured by dividing the number of followers by the total number of posts and then applying a log transformation. The average SME score was 4.71 out of a possible maximum of 10, indicating moderate engagement with Instagram followers. This suggests the need for firms to improve their social media strategies to boost interaction and engagement with their audience.

This study includes three control variables: firm growth, firm liquidity, and firm size. Firm growth is measured by the change in net income from the previous year, with an average of 0.07 across 60 observations. The optimal range for firm growth is typically between 0.1 and 0.2, indicating that KOMPAS100 firms have room to improve revenue growth to achieve this healthy level. Firm liquidity, measured by the current ratio, ranges from 0.34 to 47.66, with an average of 13.54 and a standard deviation of 14.32, reflecting significant differences in liquidity among firms. The optimal current ratio is typically between 1.5 and 3, suggesting that some firms may have excess current assets, while others need to improve their liquidity to achieve a more balanced level. Firm size is measured by the logarithm of total operating revenue to normalize data distribution. The firm size values range from 9.03 to 11.23, with an average of 10.33 and a standard deviation of 0.58, indicating that most firms in the KOMPAS100 index operate on a large scale, with relatively similar sizes. These control variables offer insights into factors affecting firm performance, highlighting stagnant revenue growth, significant liquidity variations, and comparable firm sizes during the 2018-2022 period.

Table 2: Descriptive Statistics

Variable	Obs	Min	Max	Mean	Std.Dev
FP(ROA)	60	(14.79)	28.47	5.42	8.09
FP(ROE)	60	(1.50)	2.38	0.10	0.39
OR	60	0.08	0.89	0.41	0.21
SME	60	2.53	6.94	4.71	0.99
FG	60	(16.03)	28.55	0.07	4.57
FL	60	0.34	47.66	13.54	14.32
FS	60	9.03	11.23	10.33	0.58

Table 3 presents linear regression t-test results. The significance value for the online review variable (OR) in the ROA model is greater than α (0.05), at 0.650, indicating that H1a is not accepted, and online reviews do not significantly affect Return on Assets (ROA). The significance value for the online review variable (OR) in the ROE model is equal to α (0.05), at 0.055, indicating that H1b is accepted, showing that online reviews have a weak, significantly negative effect on Return on Equity (ROE), with a coefficient of -1.155. Meanwhile, the significance value for the social media engagement variable (SME) in the ROA model is smaller than α (0.05), at 0.175, showing that H2a is not accepted, meaning that social media engagement does not have a significant effect on ROA. The significance value for social media engagement (SME) in the ROE model is 0.010, which is smaller than α (0.05), indicating that H2b is accepted, showing that social media engagement has a significantly positive effect on ROE, with a coefficient of 0.447.

Table 3 Linear Regression (t-test)

	ROA		**ROE**	
Variable	**Coef.**	**Sig t**	**Coef.**	**Sig t**
OR	(2.298)	0.650	(1.155)	**0.055**
SME	2.050	0.175	0.447	**0.010**
FG	0.348	0.122	0.279	0.334
FL	(0.215)	**0.006**	(0.007)	0.394
FS	(0.029)	0.991	(0.018)	0.520

For the control variables, firm growth, with significance values of 0.122 and 0.334, does not significantly affect either ROA or ROE. Firm liquidity, with a significance value of 0.0064, shows a significant effect on ROA. However, for ROE, firm liquidity has a significance value of 0.394, indicating that this variable does not have a significant effect on ROE. Firm size has significance values of 0.991 for ROA and 0.520 for ROE, indicating that firm size does not have a significant effect on either ROA or ROE. In conclusion, based on data from firms listed in KOMPAS100 during 2018-2022, online reviews (OR) have a weak, significantly negative effect on ROE but no significant effect on ROA, while social media engagement (SME) has a positive, significant effect on ROE but no significant effect on ROA. Firm growth and firm size do not significantly affect firm performance, while firm liquidity only significantly affects ROA.

The results of this study are conflicting when it comes to how online reviews affect firm performance. The first hypothesis (H1a), which posited that online reviews significantly affect performance, was rejected. The data, derived from KOMPAS100 firms between 2018 and 2022, aligns with previous studies. Farki & Baihaqi (2016), They discovered no connection between consumer trust or purchase intention and internet reviews or ratings. Although Social Influence Theory suggests that online reviews shape consumer perceptions and decisions (Mapanje, 2024). The lack of significant influence on ROA in this study may be due to factors such as the quality of reviews or how firms manage and respond to them. Moreover, online reviews may have a stronger impact on non-financial metrics, such as brand reputation

or customer loyalty, which are not directly reflected in short-term financial performance like ROA. (Traore, 2024).

Conversely, the second hypothesis (H1b), suggesting that online reviews negatively impact performance, was accepted for the ROE model, with a significance level of 0.055. This supports previous research (Bo et al., 2023; Park et al., 2023; Shin et al., 2021) Showing the negative impact of online reviews on performance. Descriptive statistics revealed that negative reviews were more dominant, highlighting the need for firms to improve app quality and user interaction to enhance their reputation. Social Influence Theory explains that negative reviews tend to have a stronger effect on consumer behavior, as individuals are more responsive to negative information. (Macheka et al., 2023). This can lead to reduced sales and lower firm performance, as potential consumers may be deterred by negative feedback. (Book & Tanford, 2019; Shen & Liu, 2018). Over time, the prevalence of negative reviews can harm a firm's growth, reduce customer loyalty, and negatively impact financial outcomes. (Olson & Ro, 2020).

This study provides mixed findings on the impact of social media engagement on firm performance. The first hypothesis (H2a), which suggested a significant positive effect of social media engagement on ROA, was rejected. With a coefficient of 2.050 and a significance level of 0.175, social media engagement showed no significant effect on ROA for KOMPAS100 firms (2018-2022). This may be due to the time it takes for social media efforts to impact financial performance, or the dominance of other factors such as operational management, business strategy, and market conditions (Kasanah et al., 2022). Additionally, social media engagement may not accurately reflect the quality of interaction, leading to a limited measurable impact on financial outcomes. (Kwamboka, 2024). Despite the expectations of Social Influence Theory, which suggests that social media should influence consumer behavior (Krisprimandoyo et al., 2024)The disconnect between social media interactions and short-term financial metrics like ROA might explain the lack of significant impact.

On the other hand, the second hypothesis (H2b) was accepted, showing a positive relationship between social media engagement and ROE, with a coefficient of 0.447 and significance of 0.010. This aligns with prior research (Bai & Yan, 2020; Moreno et al., 2020) Social media positively influences performance, especially by enhancing investor interest and shareholder equity. According to Social Influence Theory, active social media engagement through likes, comments, and shares strengthens brand visibility, trust, and consumer loyalty, which can translate into higher investor confidence and equity growth. (Chahine & Malhotra, 2018). Engaging content shared widely can attract new customers and increase brand awareness, while fostering trust and loyalty through consistent interaction contributes to improved firm performance overall. (Gavino et al., 2019; Ismail, 2017).

These findings are interpreted in the context of the studies reviewed earlier. (Kyriakidis & Tsafarakis, 2024; Rane et al., 2023), which emphasizes the importance of online reviews and social media engagement in shaping firm performance. While some results align with prior evidence, others contradict it, highlighting contextual factors such as review quality, negative sentiment frequency, situating the current study within the broader literature, and clarifying consistencies and discrepancies with previous research.

3.1 Additional Analysis

To enhance the accuracy and relevance of this study's findings, additional analysis was conducted by splitting the dataset into two periods: 2018-2019 (pre-COVID-19) and 2020-2022 (during COVID-19). This approach aimed to identify whether there were significant differences in the impact of online reviews and social media engagement on firm performance before and after the pandemic. The analysis used an Independent Sample T-Test, a statistical method for comparing the means of two unrelated groups to determine if there is a statistically significant difference between them. This test is commonly applied to assess whether a certain condition, such as a pre- and post-event scenario, significantly affects the measured variables, with results determined by p-values and t-values (Pšenák, 2024).

Methodologically, while the use of a t-test to compare two periods (before and after COVID) can increase the risk of Type I error if conducted repeatedly, this approach remains relevant as it only involves two groups. The significance level is adjusted by setting a threshold of $\alpha = 0.05$ and ensuring that the t-test is conducted once for each variable without repeated testing, thereby minimizing the risk of multiple testing. (Dinulhaq & Rudianto, 2023; Kim, 2015; Mishra et al., 2019). Therefore, ANOVA is not necessary, as the t-test is more appropriate and efficient for this comparison.

Table 4: Independent Sample T-Test

Variable	Period	Average	T	Probability

ROA	Pre-COVID-19 (2018-2019)	6.77	0.8470	0.4005
	During COVID-19 (2020-2022)	4.83		
ROE	Pre-COVID-19 (2018-2019)	0.09	-0.1317	0.8957
	During COVID-19 (2020-2022)	0.11		
OR	Pre-COVID-19 (2018-2019)	0.32	-2.3962	0.0198
	During COVID-19 (2020-2022)	0.45		
SME	Pre-COVID-19 (2018-2019)	4.53	-0.9200	0.3614
	During COVID-19 (2020-2022)	4.78		
FG	Pre-COVID-19 (2018-2019)	-0.75	-0.9159	0.3635
	During COVID-19 (2020-2022)	0.42		
FL	Pre-COVID-19 (2018-2019)	11.36	-0.7702	0.4443
	During COVID-19 (2020-2022)	14.47		
FS	Pre-COVID-19 (2018-2019)	10.27	0.0881	0.9301
	During COVID-19 (2020-2022)	10.26		

Table 4 shows that ROA showed no significant difference between the pre-COVID (2018-2019) and during COVID (2020-2022) periods, with a probability of 0.4005, although the pre-COVID ROA was higher. Similarly, ROE showed no significant difference (p = 0.8957), but the average ROE was higher during the COVID period, indicating its greater relevance at that time. Online reviews, however, showed a significant difference (p = 0.0198), with higher average reviews during the COVID period, suggesting they were more relevant during the pandemic. Social media engagement did not show a significant difference (p = 0.3614), although it was higher during COVID. Firm growth and firm liquidity also showed no significant differences, despite higher averages during COVID, while firm size showed no significant difference (p = 0.9301), with a higher pre-COVID average, indicating its greater relevance before the pandemic.

8. CONCLUSION

This study seeks to investigate the influence of online reviews and social media engagement on firm performance, as measured by Return on Assets (ROA) and Return on Equity (ROE), for firms listed on the KOMPAS100 Index of the Indonesia Stock Exchange (IDX) during the 2018-2022 period. The sample consists of 15 firms, with a total of 60 data points. Based on the analysis conducted using STATA 15 software, the following conclusions were drawn: Online reviews significantly impact firm performance negatively, as dissatisfied customers are more likely to leave negative feedback, while satisfied ones often refrain from posting reviews. This imbalance can create a poor perception of the product, harming the firm's performance. However, like how big data can help businesses predict customer behavior and adjust their strategies, firms can use review data to mitigate these negative effects by actively responding to reviews and addressing customer concerns. While online reviews do not have a significant impact on ROA, indicating that they do not directly affect the firm's profitability in relation to its assets, they do significantly influence ROE. This suggests that online reviews may not impact asset utilization or operational efficiency but can heavily affect shareholder perceptions and equity performance. Negative reviews can discourage investors and potentially lead to a decline in stock value, thereby impacting ROE,

which reflects equity performance more directly. An independent sample t-test revealed a significant difference ($p = 0.0198$), with higher average reviews during the COVID-19 period, suggesting that online reviews were particularly relevant during the pandemic. To these challenges, firms may benefit from actively responding to negative reviews, addressing complaints, and encouraging satisfied customers to leave positive feedback as part of a strategic response.

Social Media Engagement has a significant positive effect on firm performance. Social media allows firms to interact directly with consumers, increase brand awareness, and build loyal communities. By being active on social platforms, firms can share information about new products or services, run promotions, and receive quick feedback from customers. Moreover, the integration of information technology strategies supports firms in enhancing business processes and customer interactions, much like how artificial intelligence adoption enhances firm capabilities. Active social media interactions strengthen a firm's image and improve customer relationships. Additionally, firms that are responsive on social media tend to gain higher trust and loyalty from their customers. An active social media presence also enables firms to stay attuned to market trends and respond swiftly to changing consumer preferences. Therefore, a well-executed social media engagement strategy can help improve firm performance. This study has several limitations. It focuses solely on the impact of online reviews and social media engagement on firm performance (ROA and ROE); it excludes other potentially significant factors, such as market conditions, corporate governance, and research and development activities. With an R^2 of 0.21, 79% of performance variance is due to factors outside the study's variables. The sample is limited to KOMPAS100 firms from 2018 to 2022, focusing on large, liquid firms. This concentration may limit the generalization of findings to smaller or less publicly traded firms, reducing the overall generalizability to different sectors. Additionally, not all sample firms had official apps on the App Store, limiting the analysis of online reviews. Future research should consider expanding the sample beyond KOMPAS100 firms to include other indexes, like LQ45, and small or medium-sized enterprises (SMEs). Studies could also explore firms in other countries to account for differing market conditions and consumer behaviors. This would provide broader insights into how online reviews and social media engagement influence firm performance in diverse contexts, as well as opening opportunities for further research.

NOTE

This paper is drawn from first author thesis at Bina Nusantara University.

AUTHOR CONTRIBUTIONS

Conceptualization: Darren Donovan, Linda Kusumaning Wedari.
Data Curation: Darren Donovan.
Formal Analysis: Darren Donovan.
Investigation: Darren Donovan.
Methodology: Darren Donovan.
Supervision: Linda Kusumaning Wedari.
Writing – original draft: Darren Donovan.
Writing – review & editing: Linda Kusumaning Wedari.

DATA AVAILABILITY STATEMENT

The majority of data presented within this research was sourced from the Osiris database from Bureau van Dijk under the following link: https://login.bvdinfo.com/R1/OsirisNeo

Due to an agreement with Osiris, the research data is accessible only through subscription, which restricts its public availability. Additionally, this research utilizes financial data from the Indonesia Stock Exchange (IDX)'s database, which can be accessed publicly through the following link: https://www.idx.co.id/id/perusahaan-tercatat/laporan-keuangan-dan-tahunan

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